

Amendments to the Claims:

1-21. (Canceled)

22. (New) A method of manufacturing a composite structure comprising individual tows, the method comprising the steps of:

specifying properties regarding the structure into analytical software tools;

integrating design optimization tools with the analytical software tools to define a closed loop design system, such that the closed loop design system provides a final design;

providing true 3-D geometric tow definition of individual tows of the composite to the closed loop design system; and

translating the final design into a form understandable by a fiber placement machine.

23. (New) A method according to Claim 22 wherein providing true 3-D geometric tow definition comprises performing quantifiable computational assessments of common geometric flaws such as tow gaps and overlaps.

24. (New) A method according to Claim 23 wherein providing true 3-D geometric tow definition comprises visualizing actual tow geometry in 3-D space.

25. (New) A method according to Claim 24 wherein visualizing actual tow geometry in 3-D space further comprises selecting display parameters to accentuate design features.

26. (New) A method according to Claim 23 wherein performing quantifiable computational assessments of common geometric flaws further comprises:

analyzing the actual size and area of specific local flaws; and

analyzing the actual size and area of total flaws within a prescribed area.

27. (New) A method according to Claim 22 wherein translating the final design comprises providing output from a geometry analysis module to the fiber placement machine via simulation software and an intelligent front end.

28. (New) A method according to Claim 22 wherein integrating design optimization tools with the analytical software tools comprises employing object-oriented programming language to provide object structure.

29. (New) A method according to Claim 22 wherein integrating design optimization tools with the analytical software tools comprises simulating the final design by producing theoretical paths of the tows for a set of user-defined manufacturing criteria.

30. (New) A method according to Claim 29 wherein simulating the design further comprises:

defining input tool geometry; and
defining tow path parameters.

31. (New) A method of manufacturing a composite structure comprising individual tows, the method comprising the steps of:

specifying properties regarding the structure into analytical software tools;
integrating design optimization tools with the analytical software tools to define a closed loop design system, such that the closed loop design system provides a final design;
analyzing material properties of tows of each layer of the composite structure by drilling normal to the composite structure in any local area of the composite structure; and
translating the final design into a form understandable by a fiber placement machine.

32. (New) A method according to Claim 31 wherein analyzing material properties of each layer comprises providing user-selected methods to define local drilling positions that correlate with a finite element discretization.

33. (New) A method according to Claim 32 wherein providing user-selected methods to define local drilling positions further comprises:
defining drill sites within the periphery of a finite element; and
averaging results of the drilling.

34. (New) A method according to Claim 31 wherein analyzing material properties of tows comprises determining the material thickness of each layer of tows.

35. (New) A method according to Claim 31 wherein analyzing material properties of tows comprises determining the orientation of each layer of tows.

36. (New) A method according to Claim 31 wherein analyzing material properties of tows comprises determining the existence of certain features in any local area.

37. (New) A method according to Claim 31 wherein translating the final design comprises providing output from a geometry analysis module to the fiber placement machine via simulation software and an intelligent front end.

38. (New) A method according to Claim 31 wherein integrating design optimization tools with the analytical software tools comprises employing object-oriented programming language to provide object structure.

39. (New) A method according to Claim 31, further comprising the step of providing true 3-D geometric tow definition of individual tows of the composite to the closed loop design system prior to translating the final design.

40. (New) A method according to Claim 39 wherein providing true 3-D geometric tow definition comprises performing quantifiable computational assessments of common geometric flaws such as tow gaps and overlaps.

41. (New) A method according to Claim 40 wherein providing true 3-D geometric tow definition comprises visualizing actual tow geometry in 3-D space.

91 42. (New) A method according to Claim 41 wherein visualizing actual tow geometry in 3-D space further comprises selecting display parameters to accentuate design features.

43. (New) A method according to Claim 31 wherein integrating design optimization tools with the analytical software tools comprises simulating the final design by producing theoretical paths of the tows for a set of user-defined manufacturing criteria.

44. (New) A method according to Claim 43 wherein simulating the design further comprises:

defining input tool geometry; and

defining tow path parameters.
